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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* ZHEN LIU and GEORGE V. POPESCU

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Appeal 2009-007348  
Application 10/674,334  
Technology Center 2400

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Before JOHN A. JEFFERY, LANCE LEONARD BARRY, and  
ST. JOHN COURTENAY III, *Administrative Patent Judges*.

JEFFERY, *Administrative Patent Judge*.

DECISION ON APPEAL<sup>1</sup>

Appellants appeal under 35 U.S.C. § 134(a) from the Examiner's rejection of claims 1, 3-8, 10-15, 17-21, and 23-31. Claims 2, 9, 16, and 22 have been canceled. App. Br 2. We have jurisdiction under 35 U.S.C. § 6(b). We affirm the prior art rejections, but do not reach the merits of the provisional nonstatutory obviousness-type double patenting rejections.

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<sup>1</sup> The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, or for filing a request for rehearing, as recited in 37 C.F.R. § 41.52, begins to run from the "MAIL DATE" (paper delivery mode) or the "NOTIFICATION DATE" (electronic delivery mode) shown on the PTOL-90A cover letter attached to this decision.

## STATEMENT OF THE CASE

Appellants invented a method of delivering data packets to nodes using a header that contains an encoded distribution tree. *See generally* Spec. ¶¶ 0002, 0004. Claim 1 is reproduced below with the key disputed limitations emphasized:

1. A method of establishing transmission headers for stateless group communication of data packets to nodes in a distribution tree, said method comprising:

encoding said distribution tree to produce an encoded distribution tree;

*creating a header including said encoded distribution tree;*

*adding said header to a data packet to be distributed to said distribution tree, wherein said nodes in said distribution tree lack group state information; and*

modifying said header as said data packet is distributed down said distribution tree to remove encoded information concerning upper distribution levels of said distribution tree.

The Examiner relies on the following as evidence of unpatentability:

Auerbach	US 5,355,371	Oct. 11, 1994
Mittra	US 5,748,736	May 5, 1998
Crawley	US 5,995,503	Nov. 30, 1999

### THE REJECTIONS<sup>2</sup>

1. The Examiner provisionally rejected claims 1, 3-7, and 28 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-8 of U.S. Application No. 10/674,335 (now U.S. Patent No. 7,355,968, issued April 8, 2008). Ans. 3-7.

2. The Examiner provisionally rejected claims 8, 10-15, 17-21, 23-27, and 29-31<sup>3</sup> on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 9-32 of U.S. Application No. 10/674, 335 (now U.S. Patent No. 7,355,968) in view of Auerbach. Ans. 4-7.

3. The Examiner rejected claims 1, 4-8, 11-14, 21, 24-29, and 31 under 35 U.S.C. § 102(b) as anticipated by Crawley. Ans. 7-12.<sup>4</sup>

4. The Examiner rejected claims 3, 10, 15, 17-20, 23, and 30 under 35 U.S.C. § 103(a) as unpatentable over Crawley and Mittra. Ans. 12-15.

### CLAIM GROUPING

Regarding the § 102 rejection, Appellants argue the following claim groupings separately: (1) claims 1, 4, 5, 7, 8, 11, 12, 14, 21, 24, 25, and 27; (2) claims 28, 29, and 31; and (3) claims 6, 13, and 26. *See* App. Br. 25-31; Reply Br. 1-6. Accordingly, we select claims 1, 28, and 6 as representative of each group, respectively. *See* 37 C.F.R. § 41.37(c)(1)(vii).

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<sup>2</sup> Since the Examiner withdrew rejections under § 112 (Ans. 15), those rejections are not before us.

<sup>3</sup> The Examiner mistakenly included canceled claims 9, 16, and 22 in the heading of this rejection. *See* Ans. 4.

<sup>4</sup> Throughout this opinion, we refer to (1) the Appeal Brief filed March 31, 2008; (2) the Examiner's Answer mailed May 30, 2008; and (3) the Reply Brief filed July 30, 2008.

Regarding the § 103 rejection, Appellants argue the following claims separately: (1) claim 15; (2) claim 30; and (3) claims 3, 10, 17-20, and 23. *See* App. Br. 33-36. Accordingly, we select claim 3 as representative of group (3). *See* 37 C.F.R. § 41.37(c)(1)(vii).

THE PROVISIONAL NONSTATUTORY  
OBVIOUSNESS-TYPE DOUBLE PATENTING REJECTIONS

On the record before us, addressing the Examiner's provisional rejections would be premature. *See Ex parte Moncla*, No. 2009-006448, 2010 WL 2543659 at \*2 (BPAI June 10, 2010) (precedential). We therefore do not reach the Examiner's provisional obviousness-type double patenting rejections of claims 1, 3-8, 10-15, 17-21, and 23-31.<sup>5</sup>

THE ANTICIPATION REJECTION OVER CRAWLEY  
*Claims 1, 4, 5, 7, 8, 11, 12, 14, 21, 24, 25, and 27*

Regarding representative claim 1, the Examiner finds that Crawley discloses all the elements, including creating a header (e.g., ERA header) having the encoded distribution tree and the distribution tree's nodes lack group state information. *See* Ans. 7-8, 15-19. Appellants argue: (1) Crawley's ERA body and not the header includes the encoded distribution tree; (2) Crawley does not teach adding the header to a data packet; and (3) Crawley does not teach stateless group communications. App. Br. 25-29; Reply Br. 1-5. The issues before us, then, are as follows:

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<sup>5</sup> U.S. Application No. 10/674,335 used to formulate these rejections is now U.S. Patent No. 7,355,968.

### ISSUE

(1) Are the following limitations in claim 1 non-functional descriptive material: (a) a header including the encoded distribution tree, and (b) the distribution tree's nodes lack group state information?

(2) Under § 102, has the Examiner erred in rejecting claim 1 by finding that Crawley discloses adding a header to a data packet?

### FINDINGS OF FACT

1. Appellants show examples of a distribution tree. Appellants state that “[t]he distribution tree controls the order in which the nodes receive the data packets.” Spec. ¶ 0006; 0010-13; Figs. 1-4.

2. Appellants have not defined a data packet. *See generally* Specification.

3. Crawley discloses a method for routing or transmitting routing information in a network of routers (e.g., 100, 102, 104, 106, 108) and host devices (110, 112, 114, 116, 118). Crawley, col. 3, ll. 48-65; col. 9, l. 40 – col. 10, l. 19; Figs. 1, 10.

4. Crawley's router generates an Explicit Routing Advertisement (ERA) at step 242. The ERA includes a header and body. A distribution tree is encoded into the ERA for use by other routers along the path. Crawley, col. 9, ll. 56-63; col. 10, ll. 37-60; Figs. 10-11.

5. Crawley's ERA contains forwarding information. Examples include information that identifies a particular data flow and ERA offset adjustments in the header and a router's incoming and outgoing interfaces information and parameters and information used in routing protocols in the body. Crawley, col. 9, ll. 56-58; col. 10, ll. 43-55; Fig. 11.

6. Crawley discloses the “complete” ERA generated and stored by router A, including offset values that instruct the next router where to begin looking at tree information in the ERA. Crawley teaches generating a “new” ERA by changing an adjust offset value within the ERA header. The offset value instructs the next hop router where to locate the relevant information within the ERA body related to the next routers. Crawley, col. 11, ll. 39-46; col. 11, l. 62 – col. 12, l. 21; Figs. 12, 14, 17.

### PRINCIPLES OF LAW

All claim limitations must be considered when determining patentability. *In re Gulack*, 703 F.2d 1381, 1385 (Fed. Cir. 1983). However, the Examiner need not give patentable weight to nonfunctional descriptive material absent a new and unobvious functional relationship between the descriptive material and the substrate. *In re Ngai*, 367 F.3d 1336, 1339 (Fed. Cir. 2004); *Gulack*, 703 F.2d at 1385. The content of nonfunctional descriptive material is not entitled to weight in the patentability analysis. *See In re Lowry*, 32 F.3d 1579, 1583 (Fed. Cir. 1994); *see also Ex parte Nehls*, 88 USPQ2d 1883, 1887-90 (BPAI 2008) (precedential).

### ANALYSIS

We begin by construing a key disputed limitation of claim 1 which calls for, in pertinent part, creating a header that includes the encoded distribution tree. A header is data located at the head or beginning of a data block. Appellants also describe and show the distribution tree as a data

structure used to control the order that the nodes receive data packets. *See* FF 1. Thus, the recited header is no more than data or information that includes or describes an encoded distribution tree.

But merely reciting what information represents constitutes nonfunctional descriptive material since it does not further limit the claimed invention functionally. *Gulack*, 703 F.2d at 1385; *Nehls*, 88 USPQ2d at 1887-89. In short, the header's encoded distribution tree in claim 1 does not functionally affect the claimed method steps, such that there is a functional relationship between the distribution tree and adding the header to the data packet. That is, the method is carried out the same regardless of the information included in the header, and the encoded distribution does not affect how this method step is performed. Additionally, the header's encoded distribution tree does not functionally affect modifying the header as the data packet is distributed down the tree by changing the how the header is modified. Such non-functional descriptive material does not patentably distinguish over prior art that otherwise renders the claims unpatentable. *See Ngai*, 367 F.3d at 1339.

Similarly, claim 1 recites the distribution tree's nodes lack group state information. This too is nonfunctional descriptive material because the group state information does not functionally affect the recited method steps. Moreover, the recitation to "stateless group communication of data packets" in the preamble only states the invention's purpose or intended use. *See Catalina Marketing Int'l, Inc., v. Coolsavings.com Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002). We therefore find that the recitations to the header



including an encoded distribution tree and the distribution tree's nodes lacking group state information are nonfunctional descriptive material and do not distinguish the claimed method from Crawley.

Crawley discloses a method that generates an ERA and encodes a distribution tree for routing. FF 3-4. The ERA contains a header and thus creates a header as recited in claim 1. *See* FF 4. While Appellants do not define “data packet” in the Specification (*see* FF 2), Appellants provide a definition of this term in the Reply Brief (Reply Br. 3) to be “a smaller part of a larger item that, when reassembled with other data packets, reproduce the larger item.” We find this definition too narrow and will give “data packet” its broadest reasonable construction to include a digital information unit consisting of a header followed by a certain number of data bits or bytes<sup>6</sup>. *See In re Am. Acad. of Sci. Tech Ctr.*, 367 F.3d 1359, 1364 (Fed. Cir. 2004)(internal citations omitted).

Crawley discloses the ERA is a digital information unit that includes a header followed by an ERA body. FF 4. Moreover, Crawley discloses the ERA contains information, including a router's incoming and outgoing interfaces information and parameters and information used in routing protocols. *See* FF 5. This information is data and uses bits or bytes within the ERA. *See* FF 4-5. Crawley therefore discloses that the ERA includes both a header and data or a data packet as recited in claim 1 using the

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<sup>6</sup> *See* Stan Gibilisco, *The Illustrated Dictionary of Electronics* 510 (2001) which defines a packet as “[a] unit of digital information in PACKET COMMUNICATIONS. It consists of a header followed by a certain number of data bits or bytes.”

broadest reasonable construction. Crawley's ERA is thus more than a file (Reply Br. 2), and we find that Crawley's header is added to a data packet to be distributed to the distribution tree as required in claim 1.

Lastly, Appellants argue that Crawley's ERA is not passed down the distribution tree, but sends a different ERA to each router in the tree. Reply Br. 5-6. As Appellants present this contention for the first time in the Reply Brief, we find that this argument has been waived. *See Ex parte Borden*, 93 USPQ2d 1473, 1474 (BPAI 2010) (informative) (“[T]he reply brief [is not] an opportunity to make arguments that could have been made in the principal brief on appeal to rebut the Examiner's rejections, but were not.”). Additionally, claim 1 recites “modifying said header as said data packet is distributed down said distribution tree” and not that the distribution tree is altered in the header as Appellants contend (Reply Br. 5). Also, while Crawley discloses generating a “new” ERA, Crawley actually uses the same ERA and adjust its offset value in the header as the data packet is distributed down the tree by changing the offset value within the ERA header. *See* FF 6. We therefore do not agree that Crawley fails to teach modifying the header of a data packet as the packet is distributed down the distribution tree as recited in claim 1.

Independent claims 8 and 21 have limitations commensurate in scope to claim 1 and the above discussion is also applicable to these claims.

For the foregoing reasons, Appellants have not shown error in the anticipation rejection of independent claim 1 based on Crawley, and claims 4, 5, 7, 8, 11, 12, 14, 21 24, 25, and 27 which fall with claim 1.

*Claims 28, 29, and 31*

Regarding representative claim 28, the Examiner finds that Crawley discloses all the elements, including the distribution tree's nodes lack in group state information. Ans. 11. Appellants repeat that Crawley fails to teach stateless group communications or the nodes lack group state information. App. Br. 29. We are not persuaded and refer to our above discussion of Crawley and the distribution tree's node lack state information being nonfunctional descriptive material.

Claims 29 and 31 are commensurate in scope with claim 28. Additionally, claims 29 and 31 depend from claims 8 and 21 respectively, which are commensurate in scope with the above-discussed claim 1. For the previously-discussed reasons, Appellants have therefore not shown error in the anticipation rejection of claim 28 based on Crawley, and claims 29 and 31 which fall with claim 28.

*Claims 6, 13, and 26*

Regarding representative claim 6, the Examiner finds that Crawley discloses all the elements, including Crawley's discussion of routers operating under an Open Shorter Path First (OSPF) dynamic routing protocol reading on the dynamic group of receiver nodes. Ans. 8, 20. Appellants argue that Crawley fails to disclose the nodes are dynamic. App. Br. 30-31.

The issue before us, then, is as follows:

## ISSUE

Under § 102, has the Examiner erred in rejecting claim 6 by finding that Crawley discloses creating the distribution tree at a sender node based upon a dynamic group of receiver nodes?

## FINDINGS OF FACT

7. Appellants have not defined the term “dynamic.” *See generally* Specification.

8. Crawley discloses each router runs the Open Shortest Path First (OSPF) protocol, which is a dynamic routing protocol that detects changes in the network topology and recalculates paths. Crawley, col. 1, ll. 30-39; col. 2, ll. 58-59.

## ANALYSIS

Based on the record before us, we find no error in the Examiner’s anticipation rejection of representative claim 6 which calls for, in pertinent part, a dynamic group of receiver nodes. Appellants have provided no special or particular meaning for the recitation “dynamic group of receiver nodes.” *See* FF 7. We therefore give this term its ordinary and customary meaning which includes having nodes that operating using a dynamic protocol. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc) (internal citations omitted). Crawley discloses that each router or node runs an OSPF protocol, which is a dynamic routing protocol that detects changes in the network topology. *See* FF 8. Changes in the topology also involve changes in the path of Crawley’s receiving nodes (e.g., receiving routers). *See id.* Thus, Crawley discloses creating the distribution

tree (FF 4, 6) at a sender node (e.g., sender router A) based upon a dynamic group of receiver. We therefore disagree with Appellants that Crawley fails to disclose the claimed “creating said distribution tree at a sender node based upon a dynamic group or receiver nodes” as recited in claim 6.

Claims 13 and 26 are commensurate in scope with claim 6. Additionally, claims 13 and 26 depend from claims 8 and 21 respectively, which are commensurate in scope with the above-discussed claim 1. For the previously-discussed reasons, Appellants have therefore not shown error in the anticipation rejection of claim 6 based on Crawley, and claims 13 and 26 which fall with claim 6.

#### THE OBVIOUSNESS REJECTION OVER CRAWLEY AND MITTRA

##### *Claim 15*

Regarding independent claim 15, the Examiner finds that Crawley teaches all the limitations, except for decoding a distribution tree’s portion and re-encoding the tree. Ans. 13-14. The Examiner cites Mittra to teach this missing limitation. Ans. 14. Appellants repeat the arguments made in connection with claim 1 – namely that Crawley does not teach: (1) the encoded distribution tree is included in the header; (2) the ERA header is added to a data packet; and (3) stateless group communications. App. Br. 33-34. Appellants further assert that the Mittra does not cure these deficiencies. App. Br. 34. We are not persuaded and refer to our above discussion of claim 1. We also need not address whether Mittra cures these purported deficiencies.

*Claim 30*

Regarding claim 30, the Examiner finds that Crawley teaches all recited features. Ans. 15. Appellants repeat the arguments made in connection with claim 28 – namely that Crawley does not teach stateless group communications. App. Br. 34-35. Appellants further assert that Mittra does not cure these deficiencies. App. Br. 35. We are not persuaded and refer to our above discussion of claims 1 and 28. We also need not address whether Mittra cures these purported deficiencies.

*Claims 3, 10, 17-20, and 23*

Regarding representative claim 3, Appellants rely on the previous discussions of independent claims 1, 8, 15, and 21. App. Br. 35-36. Accordingly, we are not persuaded for the reasons discussed above regarding claims 1, 8, 15, and 21. Since Appellants have not shown error in the rejection of claim 3, we sustain the rejection of claim 3, and claims 10, 17-20, and 23 which fall with claim 3.

**CONCLUSION**

The Examiner has not erred in rejecting (1) claims 1, 4-8, 11-14, 21, 24-29, and 31 under § 102, and (2) claims 3, 10, 15, 17-20, 23, and 30 under § 103. We do not reach the merits of the provisional obviousness-type double patenting rejections of claims 1, 3-8, 10-15, 17-21, and 23-31.

**ORDER**

The Examiner's decision rejecting claims 1, 3-8, 10-15, 17-21, and 23-31 is affirmed.

Appeal 2009-007348  
Application 10/674,334

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

pgc

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EVIDENCE APPENDIX

Stan Gibilisco, *The Illustrated Dictionary of Electronics* 510 (2001).



# STAN GIBILISCO THE ILLUSTRATED DICTIONARY OF **Electronics**

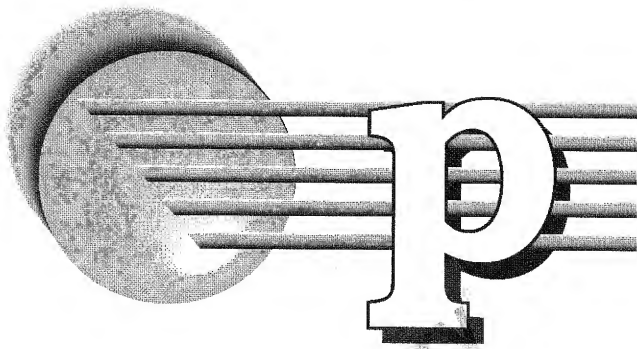
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**P** 1. Symbol for POWER. 2. Symbol for PLATE (of a vacuum tube). 3. Symbol for PHOSPHORUS. 4. Abbreviation of PRESSURE. 5. Symbol for PRIMARY. 6. Abbreviation for prefix PETA-. 7. Symbol for PERMEANCE. 8. Abbreviation of POINT.

**p** 1. Abbreviation of prefix PICO-. 2. Subscript for PEAK. 3. Abbreviation of POUND. 4. Abbreviation of POINT (often capitalized). 5. Subscript for PRIMARY. 6. Subscript for PLATE (of a vacuum tube). 7. Abbreviation of PITCH. 8. Abbreviation of PER.

**PA** 1. Abbreviation of POWER AMPLIFIER. 2. Abbreviation of PULSE AMPLIFIER. 3. Abbreviation of particular average. 4. Abbreviation of pilotless aircraft. (Also, P/A) 5. Abbreviation of PUBLIC ADDRESS (as in PA system).

**Pa** 1. Symbol for PROTACTINIUM. 2. Symbol for PASCAL.

**pa** Abbreviation of PICOAMPERE.

**pacemaker** See CARDIAC STIMULATOR.

**pacemaker** See CARDIAC STIMULATOR.

**Pacific Standard Time** Abbreviation, PST. Local mean time at the 120th meridian west of Greenwich. Also see GREENWICH MEAN TIME, STANDARD TIME, TIME ZONE, and COORDINATED UNIVERSAL TIME.

**pack** A technique for maximizing a computer memory device's storage capacity, wherein more than one information item is stored in a single storage unit. Also called *crowd*.

**package** 1. The enclosure for an electronic device or system. This includes a wide range of housings, from the simple encapsulation of miniature transistors to forced air-cooled enclosures for heavy power units. 2. To assemble and house an

electronic equipment, or to design a housing for it, in accordance with good engineering techniques. 3. A computer program of general use for an application (e.g., *payroll package*).

**package count** The number of discrete packaged circuits in a system.

**packaging density** 1. See VOLUMETRIC EFFICIENCY. 2. Computer storage capacity in terms of the number of information units that can be contained on a given segment of a magnetic medium. Also called PACKING DENSITY. 3. Within a given integrated circuit, the capacity in terms of the number of active devices that can be contained on a single silicon chip.

**packet** 1. A unit of digital information in PACKET COMMUNICATIONS. It consists of a header followed by a certain number of data bits or bytes. 2. See WAVE PACKET. 3. See PACKET COMMUNICATIONS. 4. See PACKET RADIO.

**packet communications** A method via which data is exchanged through a network between or among people or computers. Information is sent and received in blocks of information called *packets*. Each packet is routed individually through the network according to the most efficient possible path at the time of its transit. At the destination, the packets are reassembled into the original signal. This scheme makes more efficient use of network resources than continuous-connection or single-path methods. However, when network usage is heavy, there can be a delay in the arrival of a sufficient number of packets to produce an intelligible received signal.

**packet radio** The transmission and reception of PACKET COMMUNICATIONS data via radio.

**packet switching** In telephony, a method of connection in which data is exchanged between subscribers by splitting the data into units (packets). Each packet is sent over the optimum path at the time of transmission. The signal path can, and usually does, vary from packet to packet. At the destination, the packets are reassembled into the original signal. The connection is in effect nonexistent during periods of silence (no data transmitted by either subscriber). Compare CIRCUIT SWITCHING.

**packing** In the button of a carbon microphone, bunching and cohesion between the carbon granules.

**packing density** The number of discrete package circuits within a given surface area or volume.

**packing factor** 1. See VOLUMETRIC EFFICIENCY. 2. In computer operations, the number of bits that can be recorded in a given length of magnetic memory surface. Also called PACKING DENSITY.

**pack transmitter** A portable transmitter that can be strapped to the operator's back.

**pack unit** A portable transceiver that can be strapped to the operator's back or carried on an animal's back.

**PACM** Abbreviation of *pulse amplitude code modulation*.

**pad** 1. An attenuator network (usually a combination of resistors) that reduces the amplitude of a signal by a desired amount while maintaining constant input and output impedance. 2. In computer operations, to make a record a fixed size by adding blanks or dummy characters to it. 3. To lower the frequency of an inductance capacitance (LC) circuit by adding capacitance to an already capacitively tuned network.

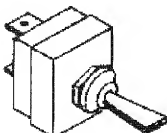
**padder** See OSCILLATOR PADDER.

**padding capacitor** See OSCILLATOR PADDER.

**padding character** In a digital communications system, a character that is inserted solely for the purpose of consuming time while no meaningful characters are sent. The insertion of such characters maintains the synchronization of the system.

**paddle-handle switch** A toggle switch the lever of which is a flattened rod. Compare BAT-HANDLE SWITCH, ROCKER SWITCH, and SLIDE SWITCH.

**PADT** Abbreviation of POST-ALLOY-DIFFUSED TRANSISTOR.



paddle-handle switch

**page** A display of text data on a computer display that completely fills the screen.

**page printer** A computer peripheral that prints a message in lines on a page, according to an established format, rather than in a single line.

**pager** 1. A public-address system used for summoning purposes. 2. See BEEPER, 2.

**page turning** The successive display of pages (see PAGE).

**pair** 1. Two wires, especially two insulated conductors in a cable. 2. A set of two particles or charge carriers (e.g., *electron-hole pair*). 3. A set of two transistors or vacuum tubes, operating together in push-pull or parallel in a power amplifier.

**paired cable** A cable consisting of separate twisted pairs of conducting wires.

**paleomagnetism** The study of certain rocks and minerals to determine the nature of the earth's magnetic field at the time the rocks were formed. When the age of the rock is determined by means of radioactive dating, and numerous rock samples are found covering many different eras, the nature of the earth's magnetic field can be graphed over time.

**palladium** Symbol, Pd. A metallic element of the platinum group. Atomic number, 46. Atomic weight, 106.42.

**palletizing** In industrial robots, the automatic placing of objects in a tray according to a computer program.

**Palm** See HANDHELD COMPUTER.

**Palm scan** In radar, a method of simultaneously scanning the azimuth and the elevation.

**PalmPilot** See HANDHELD COMPUTER.

**palmtop computer** See HANDHELD COMPUTER.

**PAM** Abbreviation of PULSE-AMPLITUDE MODULATION.

**Pan** In radiotelephony, a spoken word indicating that an urgent message is to follow. It is equivalent to the XXXX of radiotelegraphy.

**pan** 1. To make a panoramic sweep [e.g., to sweep a wide area with a beam (as from an antenna), or to sweep a wide band of frequencies with a suitable tuning circuit]. 2. A panoramic sweep made as defined in 1. 3. In audio engineering, to gradually shift from one audio channel to another or from one reproducer to another.

**pan and tilt** 1. An azimuth-elevation mounting for a television camera. 2. The simultaneous movement of a television camera in the vertical and horizontal directions.

**pancake coil** See DISK WINDING.

**panel** A flat surface on which are mounted the controls and indicators of an equipment, for easy access to the operator.

**panel lamp** 1. See ELECTROLUMINESCENT PANEL. 2. See PANEL LIGHT.

**panel light** A pilot light for illuminating the front panel of a piece of equipment.

**panel meter** A usually small meter for mounting on, or through an opening in, a panel.